

What is claimed is

1. A rapid-action coupling cylinder comprising a guiding device for the controlled insertion of a pull-in nipple (2) fixed to the underside of a workpiece pallet (19) into the central receiving aperture in the housing (11) of the rapid-action coupling cylinder (1), **characterized in that** the front face of the pull-in nipple (2) has, in the direction of insertion, conical bevels (17) that are beveled toward the rear, which cooperate with an associated – oppositely beveled conical receptacle (18) in the housing (11) of the rapid-action coupling cylinder (1).
2. A rapid-action coupling cylinder according to claim 1, **characterized in that** on the inner circumference of the receiving aperture, an inlet radius (102) is provided that cooperates with the conical bevel (17) of the capture tip (3) of the pull-in nipple (2).
3. A rapid-action coupling cylinder according to claim 1 or 2, **characterized in that** the conical receptacle (18) is formed by the upper ball bearing cup (8) and the lower spring support (9).
4. A rapid-action coupling cylinder comprising a guiding device for the controlled insertion of a pull-in nipple (2) fixed to the underside of a workpiece pallet (19) into the central receiving aperture in the housing (11) of the rapid-action coupling cylinder (1), **characterized in that** the face end of the pull-in nipple (2) incorporates a conical receptacle (33) that cooperates with an associated – oppositely beveled conical tip (34) in the housing (11) of the rapid-action coupling cylinder (1).
5. A rapid-action coupling cylinder according to any of claims 1 through 4, **characterized in that** the conical members (17, 34) disposed in the housing (11) are arranged fixed to the housing.

6. A rapid-action coupling cylinder according to any of claims 1 through 5, **characterized in that** the conical members (17, 22, 34) disposed in the housing are fixed on a lifting piston (21, 31, 61, 71) that is arranged raisable and lowerable in the housing.
7. A rapid-action coupling cylinder according to any of claims 1 through 6, **characterized in that**, in the region where the pull-in nipple (2) and lifting piston (21, 31, 61, 71) make contact, the corresponding contacting and associated surfaces are kept free from contaminations.
8. A rapid-action coupling cylinder according to claim 7, **characterized in that** the lifting piston (21, 31, 61, 71) has provided in it blowing-air openings or cooling agent openings that are directed towards the associated surfaces of the pull-in nipple (2).
9. A rapid-action coupling cylinder according to any of claims 1 through 8, **characterized in that** the lifting piston (21) is implemented also composed of several parts and that the upper part consists of an easily exchangeable wear insert (28).
10. A rapid-action coupling cylinder according to any of claims 1 through 9, **characterized in that** disposed in the lifting piston (21, 31) is a turbine wheel (36) that is driven in rotation.
11. A rapid-action coupling cylinder according to any of claims 1 through 10, **characterized in that** in the region of the conical tip (34) of the lifting piston (31), an annular projection (35) with nose-shaped cross section is provided that chops shavings that enter into the intermediate space between the pull-in nipple (2) and lifting piston (31).

12. A rapid-action coupling cylinder according to any of claims 1 through 11, **characterized in that** an air-carrying space is formed on the underside of the workpiece pallet (19).
13. A rapid-action coupling cylinder according to any of claims 1 through 12, **characterized in that** a sealing-air monitoring is provided for monitoring the flat and level seat of the workpiece pallet (19) on the top surface of the cover (6).
14. A rapid-action coupling cylinder comprising a guiding device for the controlled insertion of a pull-in nipple (2) fixed to the underside of a workpiece pallet (19) into the central receiving aperture in the housing (11) of the rapid-action coupling cylinder (1), **characterized in that** between the pull-in nipple (2) and a lifting piston (21, 31, 61, 71) disposed in the interior of the rapid-action coupling cylinder, a capturing device (50, 53, 54, 56) is arranged for the mechanical connection of the pull-in nipple to the lifting piston.
15. A rapid-action coupling cylinder according to claim 14, **characterized in that** the capturing device consists of a capture screw (50) having a stepped shape with multiple steps, which extends through the pull-in nipple (32) and is engageable to a capturing element (56) fixed on the lifting piston.
16. A rapid-action coupling cylinder according to one or more of claims 1 through 15, **characterized in that** between the pull-in nipple (2) and a lifting piston (21, 31, 61, 71) disposed in the interior of the rapid-action coupling cylinder, a capturing device (50, 53, 54, 56) is arranged for the mechanical connection of the pull-in nipple to the lifting piston.

17. A rapid-action coupling cylinder according to one or more of claims 1 through 16, **characterized in that** in the case of multiple pull-in nipples that are arranged parallel with each other on the underside of a workpiece pallet, wherein a capturing device is assigned to each pull-in nipple in a separate rapid-action coupling cylinder, all capturing devices are driven synchronously.
18. A rapid-action coupling cylinder according to claim 17, **characterized in that** the lifting pistons (71) that are connected to the capturing device in each case are mechanically connected to each other by means of a toggle-lever rod assembly (70, 72, 81, 82).
19. A rapid-action coupling cylinder comprising a locking action, effected by spring-biased balls, of a round member that has at least one locking groove and moves in a center recess of the housing in the rapid-action coupling cylinder, and whose locking action is released by displacement of the balls by means of a fluid-actuated piston, **characterized in that** the round member is implemented as a machine shaft (91) that extends through the housing (11) of the rapid-action coupling cylinder (1).
20. A rapid-action coupling cylinder according to claim 19, **characterized in that** the machine shaft (91) has one or a plurality of locking grooves (92, 93, 94) arranged at an axial distance from each other, parallel with each other, which are selectively engageable with the locking means of the rapid-action coupling cylinder (1).
21. A rapid-action coupling cylinder according to one or more of claims 1 through 20, **characterized in that** two oppositely acting rapid-action coupling cylinders (1, 1') engage in locking grooves (92, 93, 94) and create an opposite pull-in force in each case.

22. A rapid-action coupling cylinder according to one or more of claims 1 through 21,
characterized in that the machine shaft (91) is supported rotatably in the locking means of the
rapid-action coupling cylinder.